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09-942,014	08/29/2001	Andrew S. Dewa	TI-41588	9002

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EXAMINER

VINH, LAN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 05 08 2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,014

Applicant(s)

DEWA, ANDREW S

Examiner

Lan Vinh

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 29 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-6, 8-16 and 18 is/are rejected.
- 7) ☐ Claim(s) 7 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 8, 9, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neukermans et al (US 6,445,844) in view of Laor et al (US 6,430,332)

Neukermans discloses a method of fabricating optic switch using bonded silicon wafer substrates (col 15, lines 15-17). This method comprises the steps of:

forming a substrate 212 including some via holes through the substrate 212 (col 18, lines 65-67), which reads on fabricating a carrier wafer having a plurality of hole therethrough

connecting the front side of wafer 162 aligned with substrate 212 having some via holes (col 18, lines 60-67, fig. 16b), which reads on mounting a structure wafer to the carrier wafer with alignment relative to the plurality of hole in the carrier wafer

etching the openings in the wafer 162/structure wafer from its backside to form a plurality of moving mirrors having hinges (col 15, lines 34-64, fig. 18b of Neukermans shows a plurality of rotatable mirror/microstructures arranged in an array connected to a frame by hinges 176 and gimbal portions 178), which reads on etching openings through the structure wafer at location away from the plurality of holes in the carrier wafer to form a plurality of rotatable microstructures arranged in an array attached to a

frame by gimbal portions and hinges. Fig. 18b shows that the microstructures are enclosed/immobilized by substrate 224.

separating/removing the substrate 162/structure wafer from substrate 212/carrier wafer (col 17, lines 15-17, fig. 15)

Unlike the instant claimed inventions as per claims 1, 11, Neukermans fails to disclose the step of attaching permanent magnets/actuator to the structure wafer at the locations of the holes/corresponding to one of the holes in the carrier wafer.

However, Laor discloses a method for fabricating optical switching apparatus comprises the step of attaching permanent magnets/actuators 53 on the carrier wafer (col 6, lines 5-7, fig. 3a)

Since both Neukermans and Laor are concerned with method of fabricating optical switching apparatus having micromirrors, one skilled in the art would have found it obvious to modify Neukermans's method by adding the step of attaching permanent magnets/actuator to the structure wafer at the locations of the holes in the carrier wafer in view of Laor teaching because Laor states that magnets are utilized to position the central mirror surface to a selected orientation thus eliminating undesirable oscillation under external shock or other condition (see abstract, col 2, lines 50-55)

Regarding claim 10, although Neukermans discloses forming micromirrors having reflective surface (col 9, lines 54-55), Neukermans fails to disclose the step of mounting the plurality of micromirrors over a coil driver array.

Laor also discloses locating coil driver array on the lower side of micromirrors (col 8, lines 47-49)

Hence, one skilled in the art would have found it obvious to modify Neukermans's method by adding the step of locating coil driver array on the lower side of micromirrors as per Laor because according to Laor, an air coil drive assembly is used for driving the mirror magnets to rotate the mirror portion to the desired orientation (col 3, lines 33-35)

The limitation of claims 2, 10, 12 have been discussed above.

Regarding claim 8, Neukermans discloses the step of plating the substrate 162/structure wafer with a reflective layer of gold (col 16, lines 1-5)

Regarding claim 9, fig. 18a shows a microstructure separated from the substrate.

3. Claims 3-6, 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Neukermans et al (US 6,445,844) in view of Laor et al (US 6,430,332) and further in view of Kane et al (US 6,379,510)

Neukermans as modified by Laor has been described above. Unlike the instant claims inventions as per claims 3, 4, 13, 14, Neukermans and Laor do not specifically disclose the steps of mounting the carrier wafer to a support wafer, forming a mask layer over a surface of the carrier wafer/structure wafer, patterning the mask layer to expose the carrier wafer, etching through the carrier layer by wet/dry etching to form a plurality of holes and releasing the carrier layer from the support wafer.

However, Kane discloses a method of making a low-voltage micro-mirror comprises the steps of mounting the carrier wafer 9 to a support wafer 7, forming a mask layer over a surface of the carrier wafer 9 /structure wafer, patterning the mask layer to expose the carrier wafer, etching through the carrier layer by wet/dry etching to form a

plurality of holes and releasing the carrier layer from the support wafer (col 10, lines 16-60; col 11, lines 14-20, fig. 10)

Since Neukermans, Laor and Kane are concerned with method of fabricating optical switching apparatus having micromirrors, one skilled in the art would have found it obvious to incorporate the steps as taught per Kane into Neukermans and Laor because Kane states that his method employ thin film deposition techniques and photolithography for readily forming the extreme thin switch, whereby the components thereof are substantially co-planar for precisely controlled (see abstract)

The limitations of claims 5-6, 15-16 have been discussed above.

Allowable Subject Matter

4. Claims 7, 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 7, 17, the prior art of record fails to disclose the step of attaching permanent magnets at a surface of the structure wafer at locations opposite the location of the holes in the carrier layer. The closest prior art of Laor et al (US 6,430,332) only disclose the step of attaching permanent magnets at a surface of the wafer.

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lan Vinh whose telephone number is 703 305-6302. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.



LV
May 2, 2003